STUDY ON THE IMPACT OF URBAN ENCROACHMENT OVER THE CULTIVATED LAND IN SOME DISTRICTS OF THE DELTA NILE USING REMOTE SENSING DATA AND GIS

By

NAGWAN MAHMOUD MAHMOUD AFIFY

B. Arts and Education. (Geographic), Ain Sham University, 2000

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ABSTRACT

Nagwan Mahmoud Mahmoud Afify: Study on the Impact of Urban Encroachment over the Cultivated Land in some Districts of the Delta Nile Using Remote Sensing Data and GIS, Unpublished MS.c. Thesis, Arid Land Agricultural Graduate Studies and Research Institute, Faculty of Agriculture, Ain Shams University, 2013.

The study area was selected in the districts of Quesna and Banha to represent the region of Nile delta for the assessment of urban expansion over the cultivated land. Two remote sensing data sets were used in the current study as Landsat Thematic Mapper (TM5) acquired in the year 1984 and SPOT4 acquired in both the years 1995 and 2011.

In the study area, the urban expansion is acting on a unique and valued agricultural land as characterized by flat surfaces including soils that are very deep, well drained and well-structured matrix. The physiographic units are deltaic alluvial plain including soils of *Typic Haplotorrerts, fine* ; levees with *Typic Torriorthents, fine loamy*; Point bar with *Typic Torriorthents, fine loamy over sandy* and *Typic Torriorthents, coarse loamy* ; sub deltaic outcrops with *Typic Torriorthents, sandy* and bow bar with *Typic Torriorthents, fine loamy*. These sediments have high land suitability for irrigated agriculture.

The urban expansion was monitored in the years 1984, 1995 and 2011. In Qusena study area, the urbanized areas were 2884, 3669 and 6642 feddans in the years 1984, 1995 and 2011 respectively. The loss of cultivated area by urban was 785 feddans (72 feddans per year) and 2973 feddans (186 feddans per year) within the durations from 1984 to 1995 and from 1995 to 2011 respectively leaving net cultivated area as 39194 feddans. In Banha study area the urbanized areas were 3188, 3790 and 6591 feddans. The loss of cultivated area was 602 feddans (55 feddans

per year) and 4868 feddans (175 feddans per year) within the durations from 1984 to 1995 and from 1995 to 2011 respectively, leaving net cultivated area as 28829 feddans.

Residual cultivated area in Quesna (net cultivated area) includes 40556, 39507 and 36194 feddans in the years 1984, 1995 and 2011 respectively. In Banha these residual cultivated areas were assessed as 34028, 33439 and 28829 feddans in the years 1984, 1995 and 2011 respectively.

The total cultivated study area (Quesna and Banha) is covering 88768 feddans. In this area, the urbanization denatured 6072, 7459 and 13233 feddans in the years 1984, 1995 and 2011 respectively. The loss of the cultivated area was 1387 feddans (126 feddans per year) and 5774 feddans (361 feddans per year) within the durations from 1984 to 1995 and from 1995 to 2011 respectively. The residual cultivated area (65023 feddans) will be most entirely denatured within 116 years ahead of the year 2011.

This problem must be seriously managed by a definite national public decision for keeping the cultivated Nile alluvium as a protectorate applying an obligatory law to restrict this urban extension as well as a daily control along the new constructed roads against the aligning urbanization attack. Activating attractive demographic movements from the Nile Delta to new society of formal productive agricultural land must be approached by successful socio-economic program.

Key Words:

Urban encroachment, Physiography, Soil, Delta Nile, Land cover, remote sensing and GIS data

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ABBREVIATIONS

EC	:	Electrical conductivity.
ERDAS	:	Earth Resources Data Analysis System.
ET	:	Evapotranspiration.
FAO	:	Food and Agriculture Organization.
GPS	:	Geographic Positioning System.
GCPs	:	Ground Control Points.
GIS	:	Geographic information system.
ISODATA	:	The Iterative Self-Organizing Data analysis technique.
LCCS	:	Land Cover Classification System.
RMSE	:	Root Mean Square Error.
RS	:	Remote sensing.
SAR	:	Sodium Adsorption Ratio.
SWIR	:	Short Wave Infra-Red.
TIR	:	Thermal Infra-Red.
TM	:	Thematic Mapper.
USDA	:	United States Department of Agriculture.
USGS	:	United States Geological Survey.
UTM	:	Universal Transfer Mercator.
WGS	:	World Geodetic System.
WMO	:	World Meteorological Organization.